Describing the scale and composition of calls for service in Detroit

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Abstract

This short paper describes the scale and composition of emergency public demand for police services in Detroit, United States. The contribution is made in replication of analyses reported by Ratcliffe (2021), which used data from Philadelphia. Findings confirm those of Ratcliffe, namely, that requests for police services often involve incidents which do not involve crime. Instead, police spend a considerable proportion of deployment time performing a social service function, such as resolving emergency incidents involving public (mental) health. The spatial and temporal patterning of public demand for police services is distinct. In advance of the Philadelphia study, the data and code used here are openly available for reproduction and re-use.

Keywords: police, calls for service, 911, demand, reactive.

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Introduction

Amidst austerity measures, growing public expectation, and scrutiny, understanding the public demand for police services has become a priority among evidence-based policing researchers and practitioners (Boulton et al., 2017). Without a grasp on the scale ('how much?') and composition ('what type?') of police demand, we are likely to observe sub-optimal and inequitable outcomes for the public, the inappropriate distribution of public funds, and unnecessary strain on officers (Ellison et al., 2021; Lum et al., 2021). Understanding the characteristics of public demand for the police has become particularly pertinent following recent calls to rethink, and some cases, radically reform, the role and reach of contemporary police forces (Lum et al., 2021).

A study from Ratcliffe (2021) in *Crime Science* sought to describe the complexity and diversity of public demand for police services in Philadelphia, United States. The study was motivated by the recognition that police spend a considerable proportion of deployed resource resolving incidents which fall outside of the traditional crime-fighting role of the police. Instead, the origins of public demand for the police can often be attributed to a lack of supply and/or accessibility failure in other organisations, such as those providing support for people requiring (mental) health assistance (Dijk & Crofts, 2017; Wood et al., 2021). The study's findings provided data-driven evidence to suggest that the police indeed spend considerable amounts of time dealing with incidents that could be resolved by other – often more appropriate – agencies. Comparable findings were subsequently reported in the United States across multiple (anonymised) police jurisdictions (Lum et al., 2021). In advance of recent contributions, this short paper describes the public demand for police services in Detroit, United States, using open data and open code which can be used to reproduce the findings (see https://anonymous.4open.science/r/demand_detroit-FCD3/README.md).

Public demand in Detroit

The data used for this study covers the city of Detroit in Michigan, United States. The City of Detroit authority publish calls for service data through their open data portal.[1] In alignment with Ratcliffe (2021) the data used here is subset for the year 2019 and excludes those calls initiated by an officer. For each incident, the response time and time on the scene are reported. In sum, these comprise the total deployed

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[1] Accessible via https://data.detroitmi.gov/.

time officers spend on the incident. Incidents which had a total allocated time of zero minutes (or negative values) were excluded.

Each incident has a *calldescription* variable which describes the nature of the call. Call descriptions involving administrative duties (e.g., "start of shift information"), completely unknown problems, and non-deployment (e.g., "employee call in / time off") were removed. This left 207 unique call description categories. In the interests of parsimony and ease of interpretation these categories were recoded into 99 broader call descriptions.[2] This included the removal of incidents involving transporting prisoners and executing warrants, which were deemed to have been erroneously flagged as 'officer initiated.' Each call description was then categorised into the six demand type classifications used in Ratcliffe (2021). 2.8% of incidents were deemed unclassifiable. For each of the six demand classifications an 'other' incident type was generated for those incidents which consumed less than 0.2% of police time during the year. This left a total of 46 categories for the reported breakdowns, capturing ~265,000 individual public calls for service in Detroit during 2019.

Scale and composition

In alignment with Ratcliffe (2021) the frequency counts and proportional breakdowns for each demand type classifications are reported in Table 1. This tells a comparable story to Philadelphia: a considerable proportion of citizen calls for service, and in turn, time spent by officers, is committed to a diverse array of (often non-criminal) issues. In Detroit, just 47% of police time was spent dealing with calls for service relating to crime. The remainder of time was spent dealing with community issues (7%), public and mental health (7%), proactive policing (5%), quality of life incidents (19%) and traffic duties (13%). The proportional breakdown of time consumed for each incident type, grouped by the six demand classifications, are visualised in Figure 1.

Table 1: Breakdown of frequency counts and time committed for each demand type.

Demand type	Count	Count (%)	Time (%)
community	14946	5.63	6.50
crime	116571	43.95	46.73
health	20269	7.64	7.34
proactive	16151	6.09	4.82
quality of life	56541	21.32	19.30
traffic	33153	12.50	13.40
unclassified	7620	2.87	1.90

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[2]We refer readers to the corresponding GitHub repository for further details on how call descriptions were combined (https://anonymous.4open.science/r/demand_detroit-FCD3/README.md). Readers unfamiliar with R code can review the reference table entitled 'categorisation summary.'
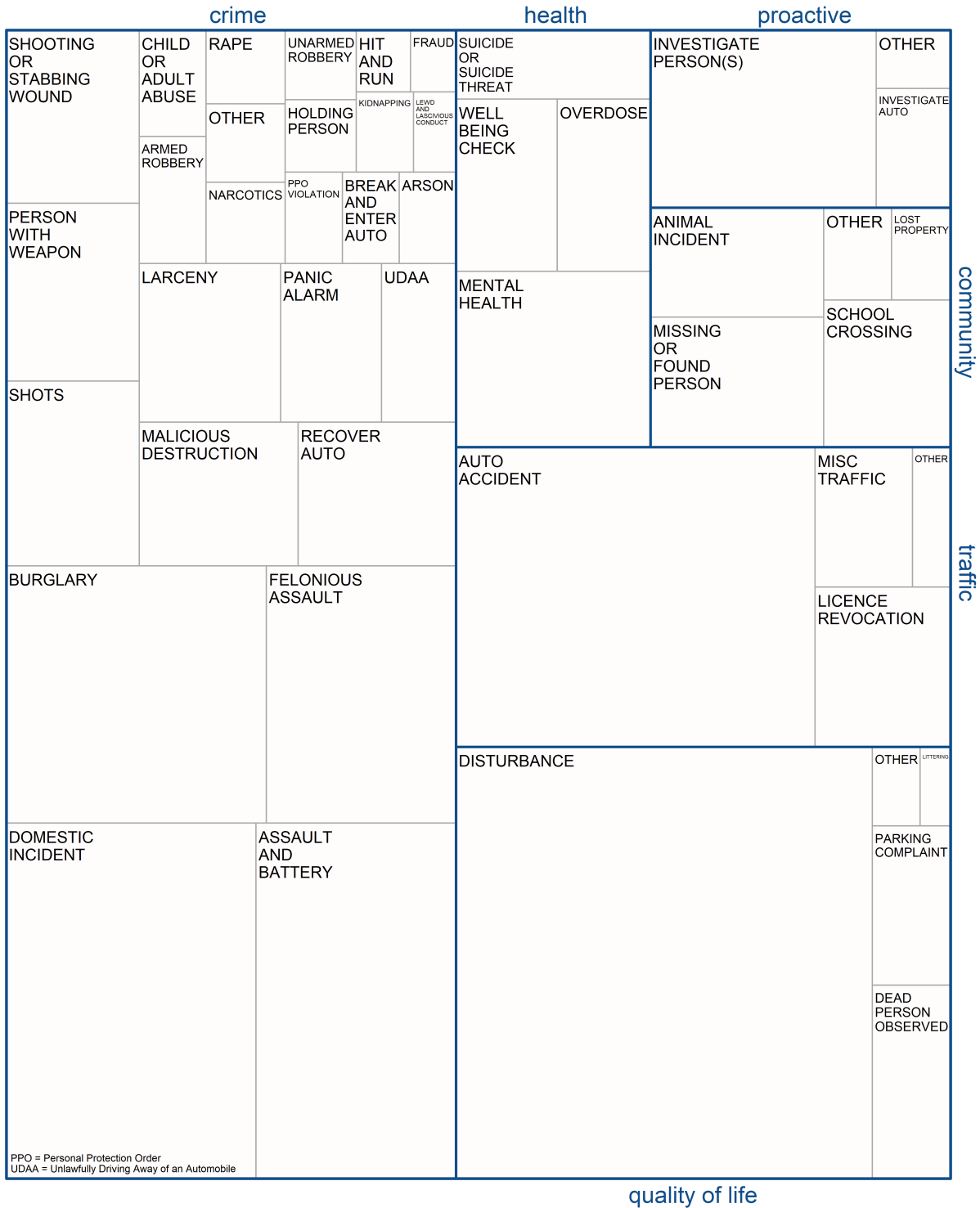
Figure 1: Proportional breakdown of deployed time spent on each incident category.

Spatio-temporal patterning

The mean incident counts by day of the week and by hour, for each demand classification, are visualised in Figure 2. This demonstrates that the different sources of public demand for police services, as indicated by the six demand classifications, can have distinct temporal patterning. Community calls appear to concentrate on weekdays, around lunchtime, when other classes of demand are low. Crime and quality of life-related calls both appear to occur in the evening and early hours of the morning, although crime incidents are more impacted by weekend activity stretching into Saturday and Sunday mornings. Traffic incidents concentrate in the evenings, particularly on a Friday. Proactive policing does not have a distinct hourly patterning, but this could be attributed to the low hourly counts. Calls relating to health issues, the primary interest of Ratcliffe (2021), appear to largely take place in the evening and early morning, aligning with findings from Philadelphia.

Individual incident location coordinates were aggregated to synthetic grid cells laid over the city to generate heatmaps of counts throughout the year.[3] These are visualised for each demand classification in Figure 3. Calls about community issues concentrate overwhelmingly in and around the Wayne State University (WSU) and the Cultural Center. Crime calls tend to cluster in hotspots near hospitals, most notably, the Henry Ford Hospital. Proactive call activity originates from the WSU area and Midtown, as does quality of life calls, which are also spread around residential areas. Health calls concentrate in Midtown and to the east, in the immediate vicinity of major well-being and mental health centres. Traffic incidents have a distinct spatial patterning along arterial roads into downtown.

Discussion

In replication of recent findings in Philadelphia (Ratcliffe, 2021) this short contribution has sought to describe the scale and composition of calls for police services in Detroit, United States. The data and code to reproduce the results reported here are openly available. Findings provide robustness to the Philadelphia study: a considerable volume of calls for service, and in turn, a considerable proportion of deployed police time, relate to incident types which do not fall under the traditional 'crime-fighting' role of the police. Instead, the police fulfill a variety of other social service functions, including the resolution of public (mental) health incidents and resolving community issues. Findings further highlight the potential implications of radically reforming (defunding) police forces in the United States through (Lum et al., 2021).

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[3]Grid cells were defined as 1000 ft^2 (305m^2) – a size deemed appropriate based on a balance between capturing localised variation and interpretable visualisations. 2% of incidents were excluded from the spatial visualisations due to incomplete geographic information.
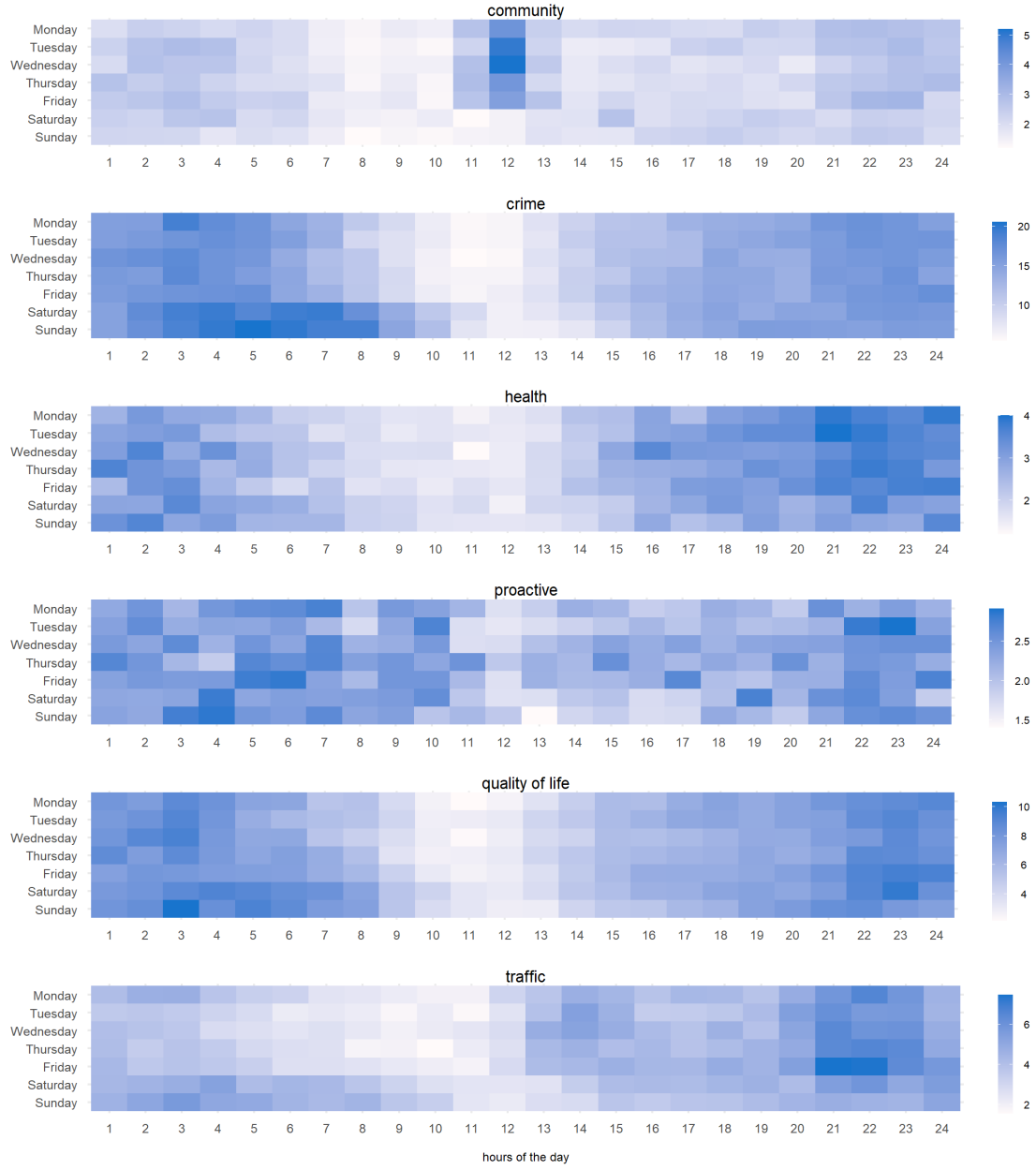
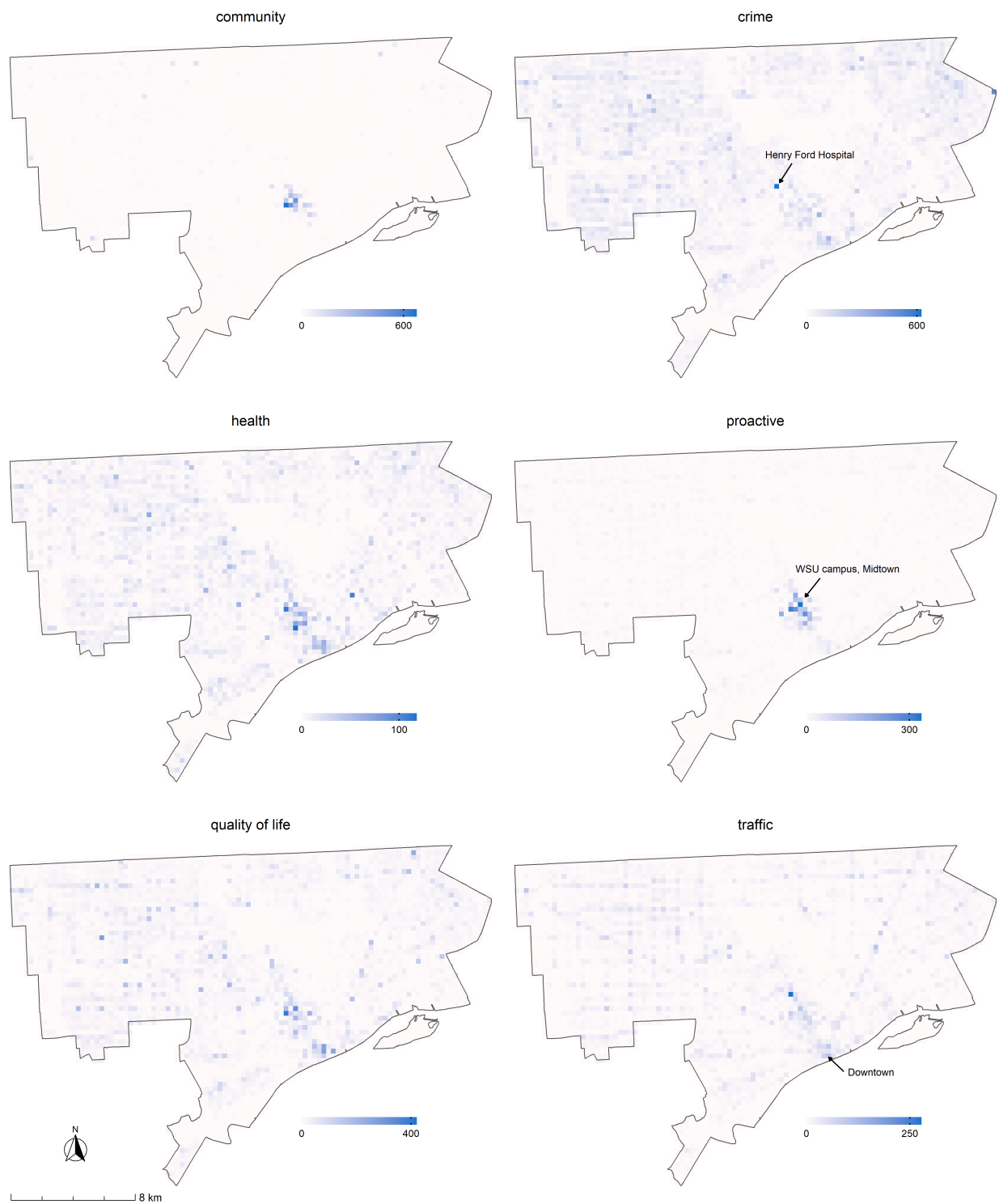Figure 2: Mean incident counts by day and hour, for each demand type.

Figure 3: Spatial patterning of total incident counts for each demand type.

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